Periscope.

a.—ANATOMY AND PHYSIOLOGY OF THE NERVOUS SYSTEM.

TERMINATIONS OF SENSORY NERVES.—In an inaugural thesis (*Beiträge zur Kenntniss der Endigung der sensiblen Nerven*, Strasburg, 1879), calling for a notice, quite exceptional for that class of literature, Dr. V. Izquierdo communicates his own observations on the above subject, the work having evidently been done in Waldeyer's laboratory.

He prefaces his remarks with an exceedingly full, but not critical, digest of the literature.

The *nerves of the cornea* were examined, in the first place, mainly with Ranvier's mode of gold-staining. According to this method, the freshly excised cornea is placed during five minutes into filtered lemon juice, hereupon immersed, for the space of 20 minutes, in 3 ccm. of a 1-per cent. solution of chloride of gold, and finally kept during 3 to 4 days in 30 ccm. distilled water, containing 2 drops of acetic acid. After hardening in alcohol, sections were made in both directions, or the entire cornea was examined after mechanical removal of the epithelium.

The animals employed were rabbits, pigeons, and canary birds—birds showing especially well the termination of the nerves in the cornea proper. Passing directly to the finer fibres, he describes the formation of the stroma plexus, immediately underneath the anterior lamella in rabbits, but more posterior in birds. At the points of junction of the fibrillæ, cells are found resembling ganglionic cells, but in reality belonging to the connective tissue. At these places there exists also an accumulation of cement, stained red by gold. From this plexus two sets of fibrillæ can be traced, the short *rami perforantes* passing through the anterior lamella, and ending in the epithelium, and a set of longer fibres terminating in the substance proper of the cornea. These longer fibrillæ pursue their course either in separate channels, tunneled through the cornea, or pass along in the canaliculi of the corneal corpuscles, hence bending occasionally at right angles. They rarely remain in one lamella, but pass obliquely forwards or backwards. They *terminate either abruptly with free ends, or connect with the protoplasmic process of the corneal corpuscles.* The latter mode is very well shown in the annexed plates; but the drawings would certainly be more trustworthy were they to represent the entire field of the microscope, and not only, as is stated, nerve-fibril and cell.

The rami perforantes, after passing through Bowman's membrane, form a set of tassel-like tufts—the so-called sub-epithelial plexus. The author agrees with Krause in locating the plexus immediately outside of the "foot plates" of the deepest layer of epithelial cells. In the description of the

termination of the fibres, the author confirms Hoyer. The fibrils pass anteriorly up to the most superficial epithelial cells, beneath which they bend at right angles, or nearly so, and pursue a short course in a direction parallel to the surface of the cornea. This last portion of the fibrillæ is not thinner than the rest. The fibrillæ cross each others' paths in many places, but do not anastomose; they are distinctly varicose. *They end abruptly, sometimes with a rounded end, but which is not thicker than an ordinary varicosity.*

The tactile globules in the beak of the duck are the next objects described. We need not follow him in this, since he agrees fully with the description of Hesse.

Studying the development of these bodies, he found the "covering cells" derived from the epithelium, which, when separated from the rest of the epithelium, receive a capsule of connective tissue, while the nerve-fibres advance and finally enter the tactile globule.

In the next place the terminal bulbs (*Endkolben*) in the clitoris of the rabbit are described. The method consisted in immersion of the excised organ in a 3-per cent. solution of acetic acid, for the space of three days, removal of the epithelium with a brush, and hardening in ¼ per cent. solution of osmic acid (24 hours), and subsequently in alcohol.

A section through the entire organ reveals a bundle of nerve-fibres, radiating and terminating in the bulbs which surround the entire body of the clitoris, like a wreath. Some of the bulbs are round, but most of them cylindrical, with the axis perpendicular to the surface. Some few bulbs are branched. They consist of a capsule, an inner bulb, and one or two nerve-fibres entering the latter.

The capsule consists of connective tissue in one or more layers. The contents of the capsule—the inner bulb—are either large cells with large nuclei and more or less indistinct outlines, appearing as if their protoplasm had become confluent, or simply a granulated mass without definite structure.

The nerve-fibre (medullated) enters at one pole of the bulb—sometimes a fibre enters at each pole. In the case of branched bulbs, the nerve branches likewise. The sheath of Henle is continuous with the capsule of the bulb, while the medullary sheath disappears gradually, after the entrance of the fibre. Where the sheath of Schwann ends could not be decided. The axis-cylinder terminates either abruptly, or with a point, without further connection with the contents of the bulb.

The last observations refer to the Pacinian corpuscles of the cat. The previous descriptions of the capsule and contents are simply confirmed. The latter is mentioned as a finely granular mass, in the periphery of which nuclei are found. In the midst of this mass the pale nerve-fibre, consisting only of the axis-cylinder, is seen, possessing a distinct striation due to its fibrillar composition. The thickness of the fibre varies; it is usually ribbon-shaped; sometimes it tapers towards the end.

The nerve-fibre, however, is not in immediate contact with the granular contents of the corpuscle, but separated from it by a membrane-like layer of homogeneous, strongly refracting substance. The layer is not of uniform

thickness, but shows varicosities, and sometimes fine striæ radiating from it into the surrounding mass. Izquierdo favors the view, that this layer is a delicate continuation of the medullary sheath of the nerve. The nerve-fibre terminates usually near the further end of the corpuscle. In some instances it perforates even the capsule, being enclosed within a tube lined with numerous nuclei, which occasionally makes a bend. The ultimate termination is either in the form of a slight tumefaction, or (more rarely) a free point. This tumefaction is sometimes globular, more often irregular in shape. It seems to be a thickening of the substance of the fibre itself.

H. G.

NERVI ERIGENTES.—According to Eckhard and Loven, the nervi erigentes arise from the first and second (rarely third) dorsal roots, passing into the hypogastric plexus, and thence with the branches from the plexus into the walls of the vessels of the penis.

Nikolsky (*Arch. fuer Anat. u. Phys.*, 1879, III. and IV. Heft, p. 209) adds to this description that the anterior or upper root of each erector nerve (the branch from the first dorsal root) is thinner than the posterior or lower root (coming from the second dorsal nerve), and that it alone receives a twig from the ramus communicans of the first sacral sympathetic ganglion. In the course of the nervi erigentes nerve-cells are found, on the posterior and lateral surface of the pars membranacea urethræ, in its connective tissue sheath, and along the fibres passing from the hypogastric plexus to the membranous portion.

The function of the nerves was tested by electric irritation, measuring at the same time the quantity of blood flowing from a divided dorsal vein of the penis. It was found that irritation of the posterior root alone of the nervi erigentes produced vascular dilatation and erection of the penis; section of these fibres allowed the vessels of the penis to contract under the tonic influence of the vaso-constrictor nerves. The anterior thin root on the other hand proved to be vaso-constrictor in its function, counteracting the effect of the dilator fibres of the nervus erigens. The pudic nerve possesses also a constricting influence upon the vessels of the penis.

The dilating fibres of the nervi erigentes are paralyzed by atropia, but stimulated to action by muscarin and asphyxia.

THE POINT OF ENTRANCE OF NERVE TRUNKS INTO MUSCLES.—In searching for a principle determining the entrance of nerve trunks into the body of the muscles, Schwalbe (*Archiv f. Anat. und Phys.*, 1879, III. and IV., p. 167) has discovered the following points:

The point of entrance of the nerve depends on the shape of the muscle, which determines also the site of the motor terminal plates. Kühne has found that the latter are situated symmetrically to a certain distance on each side of the centre, in muscles consisting of parallel longitudinal fibres. In such muscles, if about equal in breadth and thickness, the nerve enters in the centre of the belly of the muscle, for instance, teres major and minor, tensor fasciæ latæ, and some ocular muscles.

If the muscles are very long, like the sartorius, several nerve branches

enter arranged in a "nerve-line" which runs parallel with the direction of the muscle fibres, and extends to a symmetric distance on each side of the centre of the muscle. Muscles, the breadth of which exceed 2 to 3 cm., are also supplied by several branches arranged in a nerve-line vertical to the length of the muscle, for instance, glutens maximus.

In triangular muscles the point of nerve entrance approaches the tendon towards which the muscle-fibres converge, its proximity increasing with the convergence of the fibres, no matter whether this tendon be the central or distal end of the muscle. Since such muscles measure usually more than 2 to 3 ccm. in breadth at their broad insertion, they are supplied by several nerve-branches in the shape of a nerve-line. In spindle-shaped muscles the point of nerve-entrance is again situated in the centre.

All these variations are explicable on the principle *that the nerve enters the muscle in the geometric centre of the latter*. This principle is illustrated by Schwalbe by a series of mathematical considerations, for which we must refer the reader to the original.

THE INFLUENCE OF EXCITATIONS OF PERIPHERAL NERVES ON THE NERVE CENTRES.—M. Onimus, *L'Union Médicale*, July 29, had his attention called to the fact, that in numerous cases in which he had for various disorders applied the galvanic current to the sciatic, there followed the electrization a profound sleep. That this was not due to the relief of pain by the operation, is probable from the fact, that in many of the cases sleep was not ordinarily impaired from any such cause. The sleep produced by the galvanization of the sciatic was a profound, heavy slumber, and waking at the usual hour was even difficult. M. Onimus considers this effect to be due to a direct action on the cerebral circulation, and in support of this view, among other clinical and physiological proofs, he adduces the experiment of Brown-Sequard, who rendered rabbits epileptic by the section of the sciatic nerve.

Although he does not consider electrization of the sciatic as an always efficient means of producing slumber, he thinks the fact is suggestive in many points of view, clinical and therapeutical. He calls especial attention to the importance of protecting the peripheral nerves from chill, alludes to the fashionable but unphysiological practices in dressing children, leaving the lower limbs largely exposed, or but poorly protected, and states that in all the cases of infantile paralysis in regard to which he had been able to obtain accurate data, the cause was cold in some form or other, and in some it was directly attributable to chilling the lower limbs. While the cerebral and spinal centres may be affected in a reflex way through all the peripheral nerves, the sciatic appears, of all others, to exert the greatest influence in this manner. Reciprocally it is in the sphere of the sciatic that the eccentric irradiations from the spinal centres are most acutely felt, and even in cerebral affections this nerve may be similarly involved. The paper, though short, is eminently practical and valuable.

THE SUPERIOR MAXILLARY NERVE AS A TYPICAL VASO-MOTOR.—At the session of the Soc. de Biologie, June 28, M. Laffont read in his own name,

and that of M. Jolyet, a paper on this subject, which is thus reported in the *Gaz. des Hopitaux.*

At a preceding session these experimenters had announced that there are in the superior maxillary vaso-dilator nerve fibres, properly so-called, acting on the labial, nasal and gingival mucous membranes.

In a new series of researches they studied the phenomena in the triple point of view as regards heat, redness and vascular pressure, which may be considered as the tripod of vascular dilatation, and in fact the results have always agreed, no matter in what way the phenomena were studied.

1. In all the experiments in which the authors studied the effects of the electrization of the peripheral end of the superior maxillary nerve on the temperature (the temperature being taken simultaneously in the two nostrils by means of very sensitive thermometers), they found an elevation of between one and four degrees centigrade on the side operated on.

2. As regards the reddening, all the experiments have also shown that electrization of the peripheral end of the superior maxillary nerve causes an intense redness of the nasal, labial and gingival mucous membranes of the same side. The lip swells, the tactile hairs bristle on account of the turgescence of the skin, and appear like umbilici. All these phenomena are the better observed when we operate on animals in which the lips are unpigmented.

3. The tracing shown by M. Laffont to the Society, and which represented the vascular pressure taken in continuity in the maxillary artery by means of a T arrangement, shows that in this, as in the lingual artery during electrization of the peripheral end of the lingual nerve, as MM. Jolyet and Laffont first demonstrated in Nov., 1878, *the primary, immediate and persistent effect is a reduction of the arterial pressure.*

The investigations of these gentlemen therefore put us in possession of a third typical vaso-dilator nerve, and their discovery takes rank with those of Cl. Bernard on the circulation of the sub-maxillary gland, and that of M. Vulpian on that of the tongue.

Moreover, after this discovery, we should reject the hitherto dominant theory for the explanation of emotional congestions and congestions accompanying trigeminal neuralgias, which admits in these cases a temporary paralysis of the bulbar vaso-motor centres.

Finally, we have now a new proof of the existence of peripheral vaso-motor centres, as we can, as MM. Jolyet and Laffont have already said in 1878, explain this primary and immediate dilatation only by an action of these vaso-dilator nerves (for which the centre is in the medulla or brain) on the peripheral vaso-motor centres, whence they come temporarily to suspend, when they are excited, the tonic and permanent action of the vaso-constrictors.

MM. Jolyet and Laffont have, moreover, produced an experimental proof of the fact first announced by M. Cl. Bernard, that the dilators obey a less energetic excitant than do the constrictors. Indeed, when they had electrized the cervical sympathetic with a very strong current, they have seen on exciting the peripheral portion of the superior maxillary with a very weak current, a maximal pallor suddenly follow an intense redness.

These vaso-dilator filaments arise, according to the investigators, from the vidian nerve, the electrization of which gives the same effects as electrization of the superior maxillary nerve.

Origin of the Motor Nerves of the Eyes.—At the session of the Société de Biologie, June 28 (rep. in *Gaz. des Hopitaux*), M. Math. Duval reported the following results of his investigations as to the origin of the ocular motor nerves:

The nuclei of the origin of the third, fourth and sixth pairs of cranial nerves are connected together by bundles of fibres, the arrangement of which explains the complicated physiology of the associated ocular movements. Previous to the experimental researches of M. Laborde and the clinical facts published by M. Fereol and M. Graux, he had ascertained, in great measure, the anatomical facts now stated, and had recently completed the study by means of sections of the medullas of apes. A very marked bundle goes from the nucleus of the third pair to that of the sixth of the opposite side; thus we can understand the simultaneous contraction of the right internal rectus and the left external rectus, and inversely. This bundle is double in the ape, one of its branches enters the nucleus of the patheticus. This nerve, therefore, takes its origin partly from the muscles of the external motor oculi; hence there is nothing astonishing that it innervates a muscle rotating outwards, such as the superior oblique. In movements of lateral inclination of the head, this nerve acts simultaneously with that of the inferior oblique of the opposite side, but in an inverse sense. But the nucleus of the patheticus blends itself with the posterior part of that of the third pair, the point of origin of the motor-oculi communis, which innervates the inferior oblique, and the patheticus itself, decussating in the valvule of Vieussens, passes to the superior oblique of the side opposite to that on which it seems to rise. The simultaneity of action of the two oblique muscles in question is thus explained by the community of origin of their different nerves.

Physiology of the Circle of Vieussens.—At the session of the Soc. de Biologie, July 10 (rep. in *Le Progrès Médical*), M. Francois Franck reported that he had made numerous experiments on animals to determine what share of iridian, carotidian, vaso-motor, and cardiac accelerator fibres are contained in the two branches of the circle of Vieussens, which unites the first thoracic ganglion to the cervical cord of the great sympathetic. In a curarized animal he tied the anterior branch of the circle of Vieussens; there followed a dilatation of the iris, bilateral and temporary, proving that it was a reflex phenomenon. If, on the other hand, instead of tying this branch, we divide it in the middle, the excitation of its peripheral portion causes dilatation of the pupil of the same side, while excitation of the central portion causes dilatation of both pupils. There are no pupil-dilating fibres in the posterior branch of the circle of Vieussens. As regards vaso-motor fibres, they are distributed in apparently the same proportion in the anterior and posterior branches of the circle of Vieussens.

THE following are the titles of some of the recently published articles on the Anatomy and Physiology of the Nervous System :

PAWLOW, On the Innervation of the Blood Routes, *Pflueger's Archiv*, XX., 4 and 5 Apr.—VINTSCHGAU, On the Physiology of the Sense of Taste, *Ibid.*—POOLE, Effects of "Pithing" on the Vascular System, *N. Y. Med. Record*, Sept. 13.—LEWINSKI, On the Power Sense, *Virchow's Arch.*, XXVII., 134.—LUYS, Studies on the Duplication of Cerebral Operations, and on the Separate Rôle of each Hemisphere in Mental Pathology, *L'Union Med.* (cont. art.)—MARAGLIANO, Experimental and Clinical Researches on the Cerebral Temperature, *Rivista Clinica*, July and Aug.—TSCHIRIEW and DEWATTEVILLE, On the Electric Excitability of the Skin, *Brain*, July.—GALTON, Psychometric Experiments, *Ibid.*

b.—PATHOLOGY OF THE NERVOUS SYSTEM AND MIND; AND PATHOLOGICAL ANATOMY.

TENDER SPINAL POINTS IN VISCERAL AFFECTIONS.—At a meeting of the Soc. de Biologie, June 28 (rep. in *Gaz. des Hopitaux*), M. Vidal reported as the result of his observations that certain visceral affections are accompanied with pain in certain parts of the vertebral column, and that these sensitive points depend, as regards their situation, upon the organ affected. In ulcer and cancer of the stomach, pain is felt at the horizon of the sixth dorsal apophysis; in hepatic affections, at the fourth; and finally, in perityphlitis, especially if the inflammation affects the cellular tissue of the iliac fossa rather than the peritoneum, the pain is felt at the points of emergence of the two first left lumbar pairs.

M. Leven remarked that in stomach diseases the pains should be distinguished as to whether they were due to the pneumogastric or to the grand sympathetic. In the first case they coincided with the dyspnœa, the sensations of suffocation and palpitations, in the second they are more deeply situated, and are accompanied with vaso-motor disorders of the left arm and the corresponding half of the trunk.

M. Laborde disagreed with M. Vidal as to the existence of special visceral centres at definite horizons in the cord, corresponding to apophysary tender points; he combated the interpretation of the facts, not the facts themselves.

LARYNGEAL CHOREA.—A most interesting article on this subject, by Prof. Schrötler, of Vienna, was published in the *Allg. Wien. Med. Zeitung*, No. 7, 1879. The affection, as described by Schrötler and others who had written on the subject previously, presents a very striking and complex group of symptoms, exceedingly annoying and trying, not only to the patient but to those around. The prominent symptom of the disease is a cough over which the patient has no control, and which is totally different from that observed in other affections of the air passages. The cough may be either